

Claims

- [c1] 1. A method for fabricating a polysilicon layer, comprising:
providing a substrate;
forming a barrier layer on the substrate;
forming a porous material layer on the barrier layer, wherein the barrier layer and the porous material layer form a buffer layer;
forming an amorphous silicon layer on the porous material layer; and
performing a laser annealing process to form a polysilicon layer.
- [c2] 2. The method of claim 1, wherein the barrier layer is formed by chemical vapor deposition.
- [c3] 3. The method of claim 1, wherein the barrier layer comprises silicon nitride.
- [c4] 4. The method of claim 1, wherein the porous material is formed by e-beam evaporation.
- [c5] 5. The method of claim 1, wherein the porous material layer comprises silicon oxide.
- [c6] 6. The method of claim 1, wherein the porous material layer comprises an alloy of silicon oxide and aluminum oxide.
- [c7] 7. The method of claim 6, wherein a ratio of the silicon oxide to the aluminum oxide in the silicon oxide/aluminum oxide alloy is about 95:5.
- [c8] 8. The method of claim 1, wherein the thermal conductivity of the porous material layer is lower than 0.014W/cm-K (20 degrees Celsius).
- [c9] 9. The fabrication method of claim 1, wherein the laser annealing process includes an excimer laser annealing process.
- [c10] 10. A fabrication method of a polysilicon layer, comprising:
providing a substrate;
forming a barrier layer on the substrate;
forming a stress buffer layer on the barrier layer;
forming a porous material layer on the stress buffer layer, wherein a thermal

conductivity constant of the porous material layer is lower than that of the stress buffer layer, and the barrier layer, the stress buffer layer and the porous material layer form a buffer layer;
forming an amorphous silicon layer on the porous material layer; and
performing a laser annealing to form a polysilicon layer.

- [c11] 11. The method of claim 10, wherein the barrier layer is formed by chemical vapor deposition.
- [c12] 12. The method of claim 10, wherein the barrier layer comprises silicon nitride.
- [c13] 13. The method of claim 10, wherein the stress buffer layer is formed by chemical vapor deposition.
- [c14] 14. The method of claim 10, wherein the stress buffer layer comprises silicon oxide.
- [c15] 15. The method of claim 10, wherein the porous material is formed by e-beam evaporation.
- [c16] 16. The method of claim 10, wherein the porous material layer comprises silicon oxide.
- [c17] 17. The method of claim 10, wherein the porous material layer comprises an alloy of silicon oxide and aluminum oxide.
- [c18] 18. The method of claim 17, wherein a ratio of the silicon oxide to the aluminum oxide in the silicon oxide/aluminum oxide alloy is about 95:5.
- [c19] 19. The method of claim 10, wherein the thermal conductivity of the porous material layer is lower than 0.014W/cm-K (20 degrees Celsius).
- [c20] 20. The method of claim 10, wherein the laser annealing process includes an excimer laser annealing process.